



(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication of patent specification :
27.10.93 Bulletin 93/43

(51) Int. Cl.⁵ : **A23L 1/19**

(21) Application number : **91200898.4**

(22) Date of filing : **16.04.91**

(54) Whippable non-dairy creams.

The file contains technical information
submitted after the application was filed and
not included in this specification

(30) Priority : **02.05.90 EP 90304805**

(43) Date of publication of application :
06.11.91 Bulletin 91/45

(45) Publication of the grant of the patent :
27.10.93 Bulletin 93/43

(84) Designated Contracting States :
AT BE CH DE DK ES FR GB GR IT LI NL SE

(56) References cited :
EP-A- 294 119
EP-A- 0 095 001
EP-A- 2 080 325
FR-A- 2 185 018
GB-A- 1 022 089
US-A- 3 935 324

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EP 0 455 288 B1

Description

So far whippable non-dairy creams are known, which comprise water continuous fat emulsions with an aqueous phase, containing optionally some butter milk component and thickener and a fat phase, which contains fat and an emulsifier system. In FR 2 185 018 e.g. NDC's are disclosed, that contain 25-50 wt% of fat. In order to make those NDC's whippable within an acceptable time it is essential that a globular protein is incorporated in the NDC, whereas it should not contain any coagulated protein. In that way an NDC can be obtained with a minimum fat content of 25 wt% that is whippable in about 3 min.

From US 4 107 343 NDC's are known that contain 20-30 wt% of fat. However, those NDC's are only whippable in 3-5 min, when they contain a buffer and quite a large amount (more than 0.75 wt%) of an emulsifier system. The emulsifier system consists of at least three components and is therefore very complicated.

Low fat levels make NDC's in general unwhippable with an ordinary domestic, electrical whipper (e.g. a Kenwood-Chef).

This means, that in the general trend to achieve food products with a lower caloric value, whippable creams with a low fat content so far were difficult to make.

We have overcome this and therefore our invention concerns in the first place with a new whippable, low fat non-dairy cream, comprising a water-continuous emulsion of an aqueous phase, containing optionally butter milk component and thickeners and a fat phase in an amount of 15-25 wt% fat, comprising 1) fat selected from the group consisting of palm kernel, hardened palm kernel, palm mid fraction, palm stearin, palm kernel stearin, coconut, hardened coconut, cocoa butter substitutes or mixtures thereof, which fats or mixtures can contain less than 10 wt% butter fat (on NDC) and 2) not more than 0.7 wt% of an emulsifier system, comprising at least a stabilising emulsifier and a destabilising emulsifier, which NDC is whippable within 6 min, when using a domestic, electrical whipper, such as a Kenwood-Chef, either perse or after a tempering treatment. Preferred whip times are less than 4 minutes, while the butter milk component preferably is butter milk powder (BMP).

Although EP 294 119 discloses NDC's with a fat content as low as 15 wt% it does not describe our NDC's. E.g. the fats that must be used according to this EP publication must display a particular N-profile. In the only example an NDC is described that has a fat content of 25 wt%, whereas whipping times are not mentioned. In fact, whipping times would be very long (more than 7 min) when applying the disclosures of EP 294 119 to the low fat NDC's of this same document.

Our NDC preferably contains 17-20 wt% fat, whereas the fat can be chosen from the group consisting of palmkernel, palm kernel stearin, hardened palmkernel, palm midfraction, palm stearin, coconut, hardened coconut, cocoa butter substitutes, butter fat and mixture thereof. We preferably use coconut fat in the fat composition for our NDC's. A preferred fat consists of a mixture of hardened palmkernel m.p. 38°C and coconut. The two components of this last mixture preferably are present in weight ratios of 25:75 - 75:25. Although the fat phase can contain butter fat, we prefer to limit the amount of butter fat in the NDC to a maximum of 10 wt%, preferably less than 4 wt%. At least part of the fat can be replaced by well known fat replacers, e.g. polyol fatty acid polyesters. Examples of these polyesters are described in U.S. Pat. Nos. 3,600,186, 4,005,195 or EP Pat. Publ. Nos. 233,856, 236,288 and 235,836.

The best NDC's are obtained, when we incorporate 1-5 wt% of milk protein, in particular casein into our NDC's.

In the composition also an emulsifier system is present. This emulsifier system consists of: 1. stabilising emulsifiers such as saturated polyglycerol esters or saturated monoglycerides and 2. destabilising emulsifiers, such as unsaturated polyglycerol esters, unsaturated monoglycerides and lecithins. Our NDC's should contain at least one component of each of those two groups of emulsifiers.

When a lecithin is used the amount of lecithin present is less than 0.35 wt%. When a saturated monoglyceride is used we prefer to use a saturated C₁₆ or C₁₈-fatty acid monoglyceride in an amount of less than 0.25 wt%. When an unsaturated emulsifier is used we prefer to use an unsaturated monoglyceride from a C₁₈:1 fatty acid.

In order to improve the taste of an NDC it is well known to add some amount of butter milk component to the NDC. We therefore prefer NDC's, that contain up to 10 wt% butter milk powder (BMP).

The invention also comprises a method for the preparation of the whippable NDC according to the invention, mentioned above.

In the art whippable NDC's are obtained by making an emulsion of an aqueous phase, containing BMP and thickeners and a fat phase, containing the emulsifier system. These two phases are mixed under high shear, preferably homogenised at about 60°C, after which an oil in water premix is obtained.

This premix is treated with steam, according to a UHT-treatment (i.e. about 2.5 seconds with steam of about 150°C), in order to sterilise or pasteurise the premix. Indirect heat treatment via a tubular heat exchanger is also possible.

The sterilised premix is homogenised in general in two stages, after which a sterilised, homogenised product with a temperature of about 60°C is obtained. This product is cooled and stored at a temperature of 5-10°C.

However, when we use this process for the production of low fat NDC's it is often difficult to obtain an NDC, that is whippable within 6 minutes. Often we obtain an NDC that is too stable and that requires very long whipping times, if whipping is possible at all.

We have found a new process, which makes those unwhippable low-fat NDC's whippable within 4 minutes. This new process includes a tempering step at the end of the normal NDC making process. Therefore our NDC manufacturing process comprises the preparation of a whippable NDC by making an emulsion of a water phase, containing optionally butter milk component and thickeners and a fat phase in an amount of 15-25 wt% fat, comprising 1) fat selected from the group consisting of palm kernel, hardened palm kernel, palm mid fraction, palm stearin, palm kernel stearin, coconut, hardened coconut, cocoa butter substitutes or mixtures thereof, which fats or mixtures can contain less than 10 wt% butter fat (on NDC) and 2) not more than 0.7 wt% of an emulsifier system, comprising at least a stabilising emulsifier and a de-stabilising emulsifier, and processing the so-obtained emulsion by heating, sterilisation, homogenisation and cooling to a temperature below 15°C, further characterised by a tempering step, which is carried out after the cooling by warming the cooled emulsion to ambient temperature and keeping it at this temperature for several hours after which the NDC is cooled again below 15°C.

The emulsion is heated before the sterilisation advantageously to a temperature of 55-85°C. The sterilisation, which is proceeded after this heating is preferably carried out as a UHT-treatment by indirect heating via a tubular heat exchanger or preferably by injecting steam of high temperature (130-150°C) during a short time (less than 30 seconds, preferably 1-5 seconds).

The homogenisation is carried out, while the emulsion is at a temperature above the melting point of the fat, preferably at 50-85°C.

The cooling of the NDC after the homogenisation is normally proceeded to a temperature below 15°C, preferably below 10°C.

In the tempering step the emulsion normally is warmed to a temperature of 15-25°C, at which temperature the NDC is kept for 18-30 hours.

Example I:

An emulsion was made of 82 wt% of an aqueous phase, containing 7 wt% butter milk powder, 0.25 wt% lecithin, 0.15 wt% saturated monoglyceride (Dimodan), 0.08 wt% guar gum and 0.04 wt% locust bean gum and 18 wt% of a fat phase, comprising 8 wt% palmkernel 38, 8 wt% coconut oil and 2 wt% butter fat.

This emulsion was heated to 80°C and treated with steam (145°C) during 3 seconds.

The emulsion so obtained was homogenised, using pressures of 100 and 30 bar in 2 stages after which a sterilised, homogenised product with a temperature of 80°C was obtained. This product was cooled to 8°C and stored at 5°C for 1 week.

This product was warmed again to 20°C and kept at this temperature for 24 hours and cooled again to 5°C and stored for 1 week.

The NDC showed the following properties:

	fresh cream (no tempering)	tempered cream
whiptime	4 min, 10 sec	2 min, 55 sec
Boucher (= firmness)	60	75
Overrun (%)	212	205
viscosity at 5°C (mPa.s at 100 cm ⁻¹)	52	75

Example II:

As in Example I, except that the following composition was used: 85 wt% aqueous phase; 7 wt% BMP; 0.25 wt% lecithin; 0.15 wt% Dimodan; 0.08 wt% guar gum; 0.04 wt% LBG and 15 wt% fat phase, comprising 7 wt% palmkernel 38, 7 wt% coconut oil and 1 wt% butter fat.

The same processing as in Example I was applied, except that a single stage homogenisation at a pressure of 100 bar was used. The product was cooled to 8°C and stored at 5°C for 1 week. The resulting product displayed the following performance:

	untempered	tempered
whiptime	8.0 min	5.0 min
Boucher	58	64
Overrun	203 %	200 %
viscosity at 5°C (m.Pa.s at 100 cm ⁻¹)	37	150

Example III

As in Example II, except:
18 wt% fat phase, comprising 8% coconut oil, 8% palmkernel stearine and 2% butter fat. This resulted in a product with the following properties:

	<u>Untempered</u>
whiptime	4 min, 35 sec
Boucher	58
Overrun	214 %
Viscosity at 5°C	29

Example IV

As in Example III, however a fat phase with 10% coconut oil and 8% palmkernel stearine was used. Result:

	<u>Untempered</u>
whiptime	3 min, 36 sec
Boucher	62
Overrun	214 %
Viscosity at 5°C	35

Example V

As in Example III, however, a fatphase comprising 8 wt% palmkernel 38, 8 wt% palm mid fraction (Calvetta®) and 2 wt% butterfat was used. Result:

	<u>Untempered</u>
whiptime	6 min
Boucher	58
Overrun	214 %
Viscosity at 5°C	30

Claims

- 5 1. Whippable, non-dairy cream (NDC), comprising a water-continuous emulsion of an aqueous phase, containing optionally butter milk component and thickeners and a fat phase in an amount of 15-25 wt% fat, comprising 1) fat selected from the group consisting of palm kernel, hardened palm kernel, palm mid fraction, palm stearin, palm kernel stearin, coconut, hardened coconut, cocoa butter substitutes or mixtures thereof, which fats or mixtures can contain less than 10 wt% butter fat (on NDC) and 2) not more than 0.7 wt% of an emulsifier system, comprising at least a stabilising emulsifier and a de-stabilising emulsifier, which NDC is whippable within 6 min, when using a domestic, electrical whipper, either per se or after a tempering treatment.
- 10 2. Whippable NDC according to claim 1, which is whippable within 4 min.
- 15 3. Whippable NDC according to claim 1 or claim 2, wherein the NDC contains 17-20 wt% fat.
4. Whippable NDC, according to any one of claims 1 to 3, wherein the fat contains coconut fat.
5. Whippable NDC, according to claim 3, wherein the fat is a mixture of pK 38 and CO.
- 20 6. Whippable NDC, according to claim 5, wherein the fat is a mixture of pK 38 and CO with a ratio of the components within 25/75 and 75/25.
7. Whippable NDC, according to claim 1, wherein the NDC contains 1-5 wt% of milk protein, in particular casein.
- 25 8. Whippable NDC, according to claim 1, wherein the NDC contains at least a stabilising emulsifier, chosen from saturated polyglycerol esters or saturated monoglycerides and at least a de-stabilising emulsifier, chosen from unsaturated polyglycerolesters, unsaturated monoglycerides or lecithins.
- 30 9. Whippable NDC according to claim 8, wherein less than 0.35 wt% lecithin and/or less than 0.25 wt% saturated C₁₆ or C₁₈ monoglyceride is present.
- 35 10. Process for the preparation of a whippable NDC by making an emulsion of a water phase, containing optionally butter milk component and thickeners and a fat phase in an amount of 15-25 wt% fat, comprising 1) fat selected from the group consisting of palm kernel, hardened palm kernel, palm mid fraction, palm stearin, palm kernel stearin, coconut, hardened coconut, cocoa butter substitutes or mixtures thereof, which fats or mixtures can contain less than 10 wt% butter fat (on NDC) and 2) not more than 0.7 wt% of an emulsifier system, comprising at least a stabilising emulsifier and a de-stabilising emulsifier, and processing the so obtained emulsion by heating, sterilisation, homogenisation and cooling to a temperature below 15°C, further characterised by a tempering step, which is carried out after the cooling by warming the cooled emulsion to ambient temperature and keeping it at this temperature for several hours after which the NDC is cooled again below 15°C.
- 40 11. Processing according to claim 10, wherein the emulsion is heated to 55-85°C before the sterilisation.
- 45 12. Process according to claim 10 or claim 11, wherein the sterilisation is carried out as a UHT-treatment by injecting steam of high temperature during a short time.
13. Process according to any one of claims 10 to 12, wherein the homogenisation is carried out, while the emulsion is at a temperature of 50-85°C.
- 50 14. Process according to claim 10, wherein the cooling after the homogenisation is proceeded to a temperature of maximum 10°C.
- 55 15. Process according to claim 10, wherein the emulsion is warmed to a temperature of 15-25°C and kept at this temperature for 18-30 hours.

Patentansprüche

- 5 1. Schlagfähige Nichtmolkereisahne (NMS), umfassend eine wasserkontinuierliche Emulsion mit einer wäßrigen Phase, enthaltend fakultativ eine Buttermilchkomponente und Verdickungsmittel, und eine Fettphase in einer Menge von 15 bis 25 Gew.-% Fett, die umfaßt: 1) ein Fett, ausgewählt aus der Gruppe, bestehend aus Palmkernfett, gehärtetem Palmkernfett, Palmmittelfraktion, Palmstearin, Palmkernstearin, Kokosnußöl, gehärtetem Kokosnußöl, Kakaobuttersubstituten oder Mischungen davon, wobei die Fette oder Mischungen weniger als 10 Gew.-% Butterfett (bezogen auf die NMS) enthalten können, und 2) nicht
10 mehr als 0,7 Gew.-% eines Emulgatorsystems, das mindestens einen stabilisierenden Emulgator und einen destabilisierenden Emulgator umfaßt, wobei die NMS bei Verwendung eines elektrischen Haushalts-schlaggerätes innerhalb von 6 min schlagfähig ist, und zwar entweder per se oder nach einer Temperierungsbehandlung.
- 15 2. Schlagfähige NMS nach Anspruch 1, die innerhalb von 4 min schlagfähig ist.
3. Schlagfähige NMS nach Anspruch 1 oder 2, worin diese 17 bis 20 Gew.-% Fett enthält.
4. Schlagfähige NMS nach irgendeinem der Ansprüche 1 bis 3, worin das Fett Kokosnußfett enthält.
- 20 5. Schlagfähige NMS nach Anspruch 3, worin das Fett eine Mischung aus Palmkernfett 38 und Kokosnußöl ist.
6. Schlagfähige NMS nach Anspruch 5, worin das Fett eine Mischung aus Palmkernfett 38 und Kokosnußöl mit einem Verhältnis der Komponenten zwischen 25:75 und 75:25 ist.
- 25 7. Schlagfähige NMS nach Anspruch 1, worin diese 1 bis 5 Gew.-% Milchprotein, insbesondere Kasein, enthält.
8. Schlagfähige NMS nach Anspruch 1, worin diese mindestens einen stabilisierenden Emulgator, ausgewählt aus gesättigten Polyglycerolestern oder gesättigten Monoglyceriden, und mindestens einen destabilisierenden Emulgator, ausgewählt aus ungesättigten Polyglycerolestern, ungesättigten Monoglyceriden oder Lecithinen, enthält.
- 30 9. Schlagfähige NMS nach Anspruch 8, worin weniger als 0,35 Gew.-% Lecithin und/oder weniger als 0,25 Gew.-% gesättigtes C₁₆- oder C₁₈-Monoglycerid vorliegen.
- 35 10. Verfahren zur Herstellung einer schlagfähigen NMS durch Bildung einer Emulsion mit einer Wasserphase, die fakultativ eine Buttermilchkomponente und Verdickungsmittel enthält, und einer Fettphase in einer Menge von 15 bis 25 Gew.-% Fett, die umfaßt: 1) ein Fett, ausgewählt aus der Gruppe, bestehend aus Palmkernfett, gehärtetem Palmkernfett, Palmmittelfraktion, Palmstearin, Palmkernstearin, Kokosnußöl, gehärtetem Kokosnußöl, Kakaobuttersubstituten oder Mischungen davon, wobei die Fette oder Mischungen weniger als 10 Gew.-% Butterfett (bezogen auf die NMS) enthalten können, und 2) nicht mehr als 0,7 Gew.-% eines Emulgatorsystems, das mindestens einen stabilisierenden Emulgator und einen destabilisierenden Emulgator umfaßt, und Bearbeiten der so erhaltenen Emulsion durch Erhitzen, Sterilisieren, Homogenisieren und Abkühlen auf eine Temperatur unter 15°C, das weiter durch einen Temperierungsschritt gekennzeichnet ist, der nach dem Abkühlen durchgeführt wird, indem man die abgekühlte Emulsion auf Umgebungstemperatur erwärmt und sie einige Stunden auf dieser Temperatur hält, worauf die NMS
40 erneut unter 15°C abgekühlt wird.
- 45 11. Verfahren nach Anspruch 10, worin die Emulsion vor dem Sterilisieren auf 55 bis 85°C erhitzt wird.
- 50 12. Verfahren nach Anspruch 10 oder 11, worin das Sterilisieren als UHT-Behandlung durch Einführung von Wasserdampf hoher Temperatur während einer kurzen Zeit durchgeführt wird.
13. Verfahren nach irgendeinem der Ansprüche 10 bis 12, worin das Homogenisieren durchgeführt wird, während sich die Emulsion bei einer Temperatur von 50 bis 85°C befindet.
- 55 14. Verfahren nach Anspruch 10, worin das Abkühlen nach dem Homogenisieren auf eine Temperatur von höchstens 10°C erfolgt.

15. Verfahren nach Anspruch 10, worin die Emulsion auf eine Temperatur von 15 bis 25°C erwärmt und 18 bis 30 h bei dieser Temperatur gehalten wird.

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Revendications

1. Crème non laitière (CNL) fouettable, comprenant une émulsion aqueuse continue d'une phase aqueuse contenant facultativement un composant de lait de beurre et des épaississants et d'une phase grasse en une quantité de 15 à 25% en poids de graisse, qui comprend :
 - 1) une graisse choisie parmi l'huile de coeur de palmier, l'huile de coeur de palmier durcie, la fraction médiane de palmier, la stéarine de palme, la stéarine de coeur de palmier, l'huile de coprah, l'huile de coprah durcie, les substituts de beurre de cacao, ou leurs mélanges, ces graisses ou mélanges pouvant contenir moins de 10% en poids de graisse de beurre (par rapport à la CNL) et 2) pas plus de 0,7% en poids d'un système émulsifiant comprenant au moins un émulsifiant stabilisant et un émulsifiant déstabilisant, cette CNL pouvant être fouettée en 6 minutes ou moins, quand on utilise un fouet électrique domestique, soit tel quel soit après un traitement d'adoucissement.
2. CNL fouettable selon la revendication 1, qui est fouettable en moins de 4 minutes.
3. CNL fouettable selon la revendication 1 ou 2, la CNL contenant de 17 à 20% en poids de graisse.
4. CNL fouettable selon l'une quelconque des revendications 1 à 3, dans laquelle la graisse contient de la graisse de coprah.
5. CNL fouettable selon la revendication 3, dans laquelle la graisse est un mélange de CP 38 et CO.
6. CNL fouettable selon la revendication 5, dans laquelle la graisse est un mélange de CP 38 et de CO en un rapport de composants compris entre 25/75 et 75/25.
7. CNL fouettable selon la revendication 1, qui contient 1 à 5% en poids de protéine de lait, en particulier de caséine.
8. CNL fouettable selon la revendication 1, qui contient au moins un émulsifiant stabilisant choisi parmi les esters de polyglycérols saturés et des monoglycérides saturés et au moins un émulsifiant déstabilisant qui est choisi parmi les polyglycéroesters insaturés et les monoglycérides insaturés ou les lécithines.
9. CNL fouettable selon la revendication 8, dans lequel une proportion inférieure à 0,35% en poids de lécithine et/ou inférieure à 0,25% en poids de monoglycérides saturés en C₁₆ ou C₁₈ est présente.
10. Procédé de préparation d'une CNL fouettable consistant à préparer une émulsion d'une phase aqueuse contenant facultativement un composant lait de beurre et des épaississants et d'une phase grasse à raison de 15 à 25% en poids de graisse, qui comprend :
 - 1) une graisse choisie parmi l'huile de coeur de palmier, l'huile de coeur de palmier durcie, la fraction médiane de palmier, la stéarine de palme, la stéarine de coeur de palmier, l'huile de coprah, l'huile de coprah durcie, les substituts de beurre de cacao, ou leurs mélanges, ces graisses ou mélanges pouvant contenir moins de 10% en poids de graisse de beurre (par rapport à la CNL) et 2) pas plus de 0,7% en poids d'un système émulsifiant comprenant au moins un émulsifiant stabilisant et un émulsifiant déstabilisant, et à traiter l'émulsion ainsi obtenue par chauffage, stérilisation, homogénéisation et refroidissement à une température au dessous de 15°C, caractérisé en outre par un stade d'adoucissement qu'on effectue après le refroidissement en chauffant l'émulsion refroidie à la température ambiante et en la maintenant à cette température pendant plusieurs heures, après quoi, on refroidit de nouveau la CNL au dessous de 15°C.
11. Procédé selon la revendication 10, dans lequel on chauffe l'émulsion à une température de 55-85°C avant stérilisation.
12. Procédé selon la revendication 10 ou 11, dans lequel on effectue la stérilisation sous forme d'un traitement UHT en injectant de la vapeur d'eau à haute température pendant une courte durée.
13. Procédé selon l'une quelconque des revendications 10 à 12, dans lequel on effectue l'homogénéisation pendant que l'émulsion est à une température de 50 à 85°C.

14. Procédé selon la revendication 10, dans lequel on effectue le refroidissement après homogénéisation à une température maximale de 10°C.

5 15. Procédé selon la revendication 10, dans lequel on chauffe l'émulsion à une température de 15 à 25°C et on maintient à cette température pendant 18 à 30 heures.

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